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PROVISIONAL INTELLIGENCE REPORT

KRASNOYE SORMOVO SHIPYARD NO. 112, IN GOR'KIY, GOR'KIY OBLAST

CIA/RR PR-108

(ORR Project 35.505)

NOTICE

The data and conclusions contained in this report do not necessarily represent the final position of ORR and should be regarded as provisional only and subject to revision. Comments and data which may be available to the user are solicited.

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FOREWORD

This report on the Krasnoye Sormovo Shipyard No. 112 is one of a series of Soviet shipyard studies made in an effort better to assess the capabilities of the Soviet shipbuilding industry.

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Krasnoye Sormovo Shipyard No. 112	Inside Back Cover
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KRASNOYE SORMOVO SHIPYARD No. 112, IN GOR'KIY, GOR'KIY OBLAST*

Summary and Conclusions

The Krasnoye Sormovo Shipyard No. 112, imeni A.A. Zhdanov, in Gor'kiy, Gor'kiy Oblast, is the most important inland shipyard in the USSR. The capability of the shipyard to produce all classes of submarines, river vessels, and Caspian Sea vessels, as well as steel, locomotives, army combat tanks, diesel engines, machinery, and other producer and consumer goods, places it among the most important industrial installations in the USSR. Although the principal current production is W-class submarines and vessels for the inland waterway system and the Caspian Sea, it is possible that a small number of locomotives and army combat tanks are also being produced. About 250,000 tons of ingot steel are produced annually in the metallurgical section of the shipyard.

The design and arrangement of the shipbuilding facilities indicate greater emphasis on construction than on repair. The estimated current annual production of the shipyard is 26 W-class (long-range) submarines totaling 31,200 standard displacement tons (SDT)** and tugs, self-propelled and non-self-propelled oil and dry cargo barges, dredges, crane ships, passenger ships, and the like for the inland waterways and Caspian Sea totaling 12,000 light displacement tons (LDT).*** This

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 February 1955.

** Standard displacement of a surface vessel is the displacement (in tons of 2,240 pounds) of the vessel complete, fully manned, engaged, and equipped ready for sea, including all armament and ammunition, equipment, outfit, provisions and fresh water for crew, miscellaneous stores, and implements of every description that are intended to be carried in war but without fuel or reserve boiler-feed water on board. Standard displacement of a submarine is the surface displacement and is similar to the standard displacement of a surface vessel but without lube oil, fresh water, or ballast of any kind on board.

*** Light displacement is the displacement (in tons of 2,240 pounds) of a vessel complete and ready for service in every respect, including permanent ballast (solid or liquid) and liquids in machinery at operating levels but without personnel and effects, cargo, fuel, or any items of consumable or variable load.

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production constitutes a major contribution in the buildup of both the Soviet naval fleet and inland waterway fleet.

With existing facilities and employing one 8-hour labor shift, the shipyard is capable of producing annually 55,440 SDT of naval construction, which is equivalent to 42 W-class submarines and 24 patrol vessels or large landing ships. Assuming that production is stepped up by the use of 3 labor shifts, the possible annual production is estimated to be 90,630 SDT, which is equivalent to 68 W-class submarines and 43 patrol vessels or large landing ships. The estimate of production of submarines and naval surface craft is based on the continued practice of final fitting out and conducting trials at Baku on the Caspian Sea. Should the existing facilities be devoted to merchant shipbuilding, the shipyard is capable of building (employing one 8-hour labor shift) 60,000 LDT of merchant ships, which is equivalent to 32 tugs, 30 self-propelled oil barges, 7 Caspian Sea tankers, and 15 non-self-propelled oil barges.

The current labor force (direct and indirect) is estimated to be about 26,750 persons. Should the plant undertake the annual production of 55,440 SDT of naval construction, the labor force would be increased to about 38,000 persons. No difficulty is anticipated in recruiting the larger labor force.

The shipyard is well situated to receive raw, semifinished, and finished material from the industrial plants in the Leningrad-Moscow area, the Urals, and the Ukraine by relatively short rail hauls. The inland waterway system, which is open to navigation from 180 to 200 days each year, connects the plant with the Baltic, White, Caspian, and Black Seas. This waterway system is of strategic importance in the distribution of completed submarines by means of shallow-draft transporter docks to the Baltic and White Seas.

I. Name and Location.

The Krasnoye Sormovo Shipyard No. 112, imeni A.A. Zhdanov, commonly referred to as Krasnoye Sormovo No. 112, is located in the Sormovo suburb of the city of Gor'kiy, Gor'kiy Oblast, in Economic Region

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VII.* The shipyard is located on the south bank of the Volga River, approximately 3.7 miles west-northwest of the confluence of the Volga and Oka Rivers and approximately 1.5 miles west of the Gor'kiy Railroad Bridge over the Volga River. The plane coordinates are latitude 56° 21' N, longitude 43° 52' E. 1/**

The Gor'kiy Astrakhan' reach of the Volga River connecting Gor'kiy with the Caspian Sea is about 1,430 miles in length. The limiting depth of this reach is normally 11 feet. The river is frozen from mid-November to mid-April. Spring ice drifts last about 20 days. Floods, generally in the latter part of April and early May and lasting about 3 or 4 weeks, often cause rises of 25 feet. The distance from Astrakhan' to Baku is about 500 miles, making a total of over 1,900 miles from Gor'kiy to Baku. The waterway system connecting Gor'kiy with the Baltic and White Seas consists of the upper reach of the Volga, the Mariinskiy Kanal, and the Baltic-White Sea Waterway. The distance from Gor'kiy to Leningrad is about 1,000 miles, and to the White Sea about 950 miles. These waterways are frozen from November to May. The limiting depth is normally about 6 feet. 2/

The shipyard extends along the river front about 4,400 feet and inland about 4,000 feet. It covers an area of approximately 300 acres.

Gor'kiy is strategically located on one of the main double-track rail routes between Moscow (272 miles west) and the Central Urals, connecting at Kirov (284 miles northeast) with the Trans-Siberian rail system. The Volga River and its tributaries and canals provide a water transportation link with the Baltic, White, Black, and Caspian Seas.

II. History.

The Krasnoye Sormovo Shipyard, founded in 1849, 3/ is the oldest and largest of the old shipbuilding enterprises in the USSR.

The shipyard built many of the early paddle-wheel steamers for service on the inland waterways of Russia and became one of the leading concerns engaged in this class of work. Many paddle-wheel

* The term region in this report refers to the economic regions defined and numbered on CIA Map 12048.1, 9-51 (First Revision, 7-52), USSR: Economic Regions.

** For serially numbered source references, see Appendix C.

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steamers were built up to about 1890, but later the shipyard pioneered the changeover to screw propulsion and produced the first river steamer of this type in Russia. Dry-cargo diesel vessels were being built in 1914, and by 1941 many motorships with diesel-propelling machinery had been produced, including oil tankers for the Caspian Sea and passenger boats for the Moscow-Volga canal as well as cargo vessels, tugs, dredges, barges, and the like. The production of submarines in the shipyard began about 1934 and continued during World War II. The production of commercial craft practically ceased during the war. Since World War II the shipyard has been reorganized and re-equipped for the building of motor river craft, dumb barges, and submarines by the application of subassembly methods of ship construction, electric welding, and series production technique.

The extensive engineering works adjoining the shipyard was originally established principally for the construction of reciprocating steam engines and boilers for the ships built by the associated shipbuilding section. Locomotive and rolling stock construction was introduced later, and during the past 50 years many main-line steam locomotives and railway cars have been built for the Russian railway system.

The metallurgical department and rolling mill produced plates, rolled sections, and other steel products principally for internal consumption. The diesel engine department, started about 1920, built many heavy, slow-running, two-stroke diesels for seagoing merchant ships and medium-speed, four-stroke diesels for river craft, as well as similar stationary diesels for general industrial requirements.

The earliest Russian-built army combat tanks were produced in the engineering works of this shipyard, and during the war the manufacturing plant was rearranged and re-equipped for the mass production of armored fighting vehicles, which were produced in vast quantities. Armored fighting vehicle production was discontinued in 1947, when the plant was reorganized and re-equipped with machine tools and other manufacturing equipment from Germany. 4/

Locomotive building, which was resumed after the war, is believed to be tapering off with the increase of submarine building. It is believed that diesel engine building was not resumed after the war.

The metallurgical department and rolling mill have continued production since the war.

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The entire combine now ranks as one of the most extensive mechanical engineering works and submarine building plants in the USSR. 5/

III. Organization.

Before the reorganization of March 1953 the shipyard came under the Ministry of Transport Machine Building. 6/ Following the reorganization the shipyard came under the Ministry of Transport and Heavy Machine Building. In the reorganization of April 1954, at which time the Ministry of Shipbuilding re-emerged from under the Ministry of Transport and Heavy Machine Building, it is probable that the plant was placed under the Ministry of Shipbuilding. This assumption is based on the apparent reduction in the production of transport machinery and the increased emphasis on the production of river vessels and submarines.

IV. Importance.

Because of the strategic location of the shipyard (see I, above) and its capability to build river craft, Caspian Sea vessels, and submarines of all sizes, the yard is the most important inland shipyard in the USSR. The steelmaking facilities and the excellent machine-building facilities of the shipyard add considerably to its independence of other industries.

The shipyard is considered to be one of the major industrial plants in the USSR which, in addition to the construction of submarines, can be quickly converted to the mass production of army combat tanks and other war materiel.

V. Buildings and Facilities.

The plant suffered practically no damage during World War II. Buildings, most of which are masonry, 7/ range in age from very old to very new (for example, the new buildings for the assembly of submarines).

Extensive renovation and modernization took place during the conversion of the shipyard facilities from the production of war goods to the production of ships and submarines. In 1946 it was reported that 165 million rubles would be spent on reconversion. 8/ This amount probably was scheduled for expenditure during the Fourth

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Five Year Plan (1946-50) and did not include the cost of the expansion during the Fifth Five Year Plan (1951-55) for the building of submarines.

The shipyard is protected on the land side by a fence about 7 feet high with watch towers located about every 650 feet. The watch towers are manned by armed sentries. All entrances to the plant are guarded by armed guards, and entrance is by pass only. 9/

Intrayard transportation is chiefly by railroad. Trackage is generally Soviet standard gage, so that freight cars may be shunted directly into shops and to the shipbuilding ways without transshipment of freight.

Most of the postwar reports from prisoners of war dealt with the cleaning-up operations and renovation of buildings and past (wartime) use of buildings and facilities. Many reports were on the facilities for the production of army tanks. It is doubtful, with the exception of the metallurgical department and rolling mill, that the use of the buildings as reported by prisoners of war for the years 1946 to 1948 is now the same.

The accompanying chart of the shipyard,* developed from enlarged aerial photography but revised to agree with various intelligence reports, is believed to present a reasonably accurate picture. Most of the buildings within the engineering works section are not identified. Within this section are the excellent steelmaking facilities, foundries, machine shops, forges, mold loft, plate shops, fabrication and subassembly shops, design and administrative offices, and other related buildings. The area bordering the Volga River is used for ship assembly.

The following comments pertain to certain buildings and facilities in this area:

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3.* Submarine Assembly Building.

The submarine assembly building at point 3, which was nearing completion in late 1953, is believed to be used for the mass production of long-range submarines. 10/ It is estimated to be about 320 feet wide by about 680 feet long and about 54 feet high to the eaves. It has 5 bays, and it is estimated that 10 long-range submarines can be assembled concurrently.

4. Submarine Assembly Building.

The submarine assembly building at point 4¹ probably was under construction in 1946 because several prisoners of war reported new construction in this area. 11/ The building probably was completed in 1949, and it is possible that the first of the W-class submarines was built here. The building is estimated to be about 220 feet wide by about 360 feet long. It has 3 bays, and it is estimated that 3 long-range submarines can be assembled concurrently.

Machinery and hull subassemblies probably are fabricated and assembled in the engineering works section of the shipyard and moved by rail to the submarine assembly buildings.

2. Launching Ways.

Submarines or other vessels built in the buildings at points 3 and 4 on the chart are moved on rails from inside the buildings to the transverse launching ways (point 2), where they are launched directly into the Volga. It is believed that vessels are control-launched and that launching can take place at any time during the open navigation season of the Volga. These launching ways could be used during the winter months to store vessels completed in the adjacent buildings. Also, it may be possible to drydock river vessels here for repair during the winter freezeup.

* The subsection numbers in Section V are not complete and are not in sequence. Rather, those that are given are identifying numbers that correspond to those found on the chart of the shipyard, inside back cover.

Certain numbers have been omitted because nothing is known about the buildings which they identify except their probable use.

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8. Shipbuilding Area and Tower Crane.

The open area (point 8), running east from the launching ways, is used for the construction of non-self-propelled barges and small craft. 12/ Vessels are built on transverse building ways and launched directly into the Volga at any time during the open navigation season. In addition to being served by an unknown number of small locomotive cranes, this building area is served by a large mobile tower cantilever crane. This crane is estimated to clear about 50 feet under the jib and have a working radius of about 75 feet. The lifting capacity is unknown, but it is probably capable of handling 20- to 30-ton subassemblies.

30, 31. Shipbuilding Basins and Tower Cranes.

The exact size and location of the basins at points 30 and 31 are not definite. Ground photography of this section of the shipyard, taken in September 1953, shows two tower cantilever cranes in operation. 13/ These cranes are believed to operate alongside the basins, as indicated on the chart.

The basin at point 30 is estimated to be about 1,425 feet long by 115 feet wide and 25 feet deep. The basin at point 31 is estimated to be about 1,000 feet long by 70 feet wide and 25 feet deep. The elevated center section is about 25 feet wide and carries cranes and probably railroad tracks. 14/

It is believed that self-propelled vessels such as cargo ships, passenger vessels, dredges, crane vessels, and other relatively complex designs are built in these basins. Launching from these basins follows an antiquated method -- one that was used before World War II. Ships built in the basins are launched only during the period of spring flood, which lasts from 2 to 4 weeks. The earth dam (point 39) is removed, and flood waters fill the basin. The floating ships then are towed out in a manner similar to undocking from a flooded graving dock. 15/

The several mobile tower cantilever cranes serving these basins are similar to the crane serving the barge-building area (point 8).

A comparison of the method for building and launching merchant vessels with that of building and launching submarines shows

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the difference in emphasis placed by the Soviet government on the production of each.

13. Tug Assembly Shop.

The tug assembly shop could not be definitely located. Mention, however, is made in the Soviet press in 1949 and again in 1951, including photographs of tugs under construction and being moved to the launching site, of the "tug-boat shop" in which tugs are completely assembled and ready for launching. 16/ It is probable that these tugs may be moved to the bank of the Volga and from there lifted into the water by one of the large floating cranes serving the shipyard.

Floating Cranes.

Two floating cranes of unknown lifting capacity serve the shipyard. 17/

Transporter Docks.

Submarines built in the shipyard are transported to Baku, on the Caspian Sea, for final fitting out and sea trials. 18/ These submarines are transported in specially designed shallow-draft transporter docks. Three docks, each containing one submarine, were sighted in Astrakhan' in late 1950. These docks were U-shaped and estimated to be about 230 feet long by 53 feet wide over-all, with a 40-foot clear space between the dock walls. The submarine in each dock was estimated to be about 262 feet long, with the stern of the submarine extended about 32 feet beyond the stern of the dock. Both the submarines and the transporter docks were reported to have been built at the shipyard. 19/ Similar docks were observed in this shipyard in late 1953. 20/ The number of transporter docks used to transport submarines to Baku and possibly from Baku to the Baltic and White Seas, is unknown. Because of the shallow depth of the inland waterway system, added buoyancy has to be provided to move large submarines safely through the shallow areas. The shallow-draft transporter docks, therefore, are highly essential for the distribution of submarines built at the shipyard.

Fitting-Out Facilities.

No special fitting-out facilities have been observed. In 1947 and 1948, repair work on submarines was carried out with the aid

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of the floating cranes. 21/ The bank of the Volga, in the area of the shipyard, has been described as being unshored and having a 20- to 30-degree slope. 22/ No built-up quays or piers have been observed. Apparently vessels, including submarines, are launched essentially complete, leaving only minor items to be installed.

VI. Production.

Before World War II the Krasnoye Sormovo Shipyard No. 112 was noted for the production of steel, locomotives, diesel engines, army combat tanks, river and Caspian Sea vessels, submarines, and machinery.

In the postwar years the production of steel has continued at a high rate. It is estimated that the metallurgical section produces annually about 250,000 tons of ingot steel. 23/ Much of this steel is used in the machine-building and shipbuilding sections of the plant.

It is doubtful that diesel engine production in the shipyard was resumed after the war. It is believed that the production of locomotives and army tanks has tapered off until now this production is of relatively minor importance. On the other hand, the production of ships, especially submarines, has increased.

The ship assembly facilities of the shipyard are divided into two separate areas. The one area, comprising buildings 3 and 4 and the associated launching ways, is currently devoted to the construction of submarines. The remainder of the ship assembly area, comprising basins 30 and 31 and area 8, together with the tug-building shop (probably building 13), is currently devoted to the construction of river craft. The engineering works section of the shipyard supports both sections of the shipbuilding area with hull subassemblies and assembled machinery components.

The building of river ships was resumed in 1947. Since that time the shipyard has built many barges, tugs, motor freight ships, self-propelled dredges, icebreakers, crane ships, floating cranes, passenger vessels, and other miscellaneous craft. Table 1* shows the production of river craft for the years 1947 through 1954 in the shipyard. This table was compiled largely from Soviet press releases, and it is

* Table 1 follows on p. 11.

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Table 1

Reported Production of River Vessels
in the Krasnoye Sormovo Shipyard No. 112 24/
1947-54

Light Displacement Tons								
Type	1947	1948	1949	1950	1951	1952	1953	1954
Oil barge <u>a/</u>	1,036	6,216	6,216	6,216	N.A.	N.A.	518	N.A.
Cargo <u>b/</u>	N.A.	7,280	7,280	2,730	3,640	3,640	N.A.	N.A.
Tug <u>b/</u>	N.A.	968	2,420	242	N.A.	1,210	484	N.A.
Dredge <u>c/</u>	N.A.	N.A.	N.A.	1,448	4,048	1,448	N.A.	650
Icebreaker <u>b/</u>	N.A.	N.A.	N.A.	1,200	N.A.	N.A.	N.A.	N.A.
Crane ship <u>b/</u>	N.A.	N.A.	N.A.	2,000	2,000	2,000	N.A.	2,000
Passenger vessel <u>b/</u>	N.A.	N.A.	N.A.	N.A.	N.A.	5,000	N.A.	N.A.
Total	<u>1,036</u>	<u>14,464</u>	<u>15,916</u>	<u>13,836</u>	<u>9,688</u>	<u>13,298</u>	<u>1,002</u>	<u>2,650</u>

a. Non-self-propelled.

b. Self-propelled.

c. Both non-self-propelled and self-propelled.

considered doubtful that all production was reported. The reduction in production during 1953 and 1954 may largely be attributed to a lack of reporting, although production may have been slightly reduced. Current annual production is estimated at about 12,000 LDT. This estimate is based on a continuation of river shipbuilding but at a slightly reduced rate from that of 1949-52, when emphasis was placed on replacing war losses and on building up river transportation, including additional vessels required by the expansion of the inland waterway system by the opening of the Volga-Don Canal. Current production is estimated to be on the basis of one 8-hour shift.

In 1947, two partially completed submarines were observed on building ways near the bank of the Volga in the vicinity of building 16. These submarines were the remainder of a wartime program and were probably completed after 1949. 25/ The resumption of the construction of new submarines began in 1949 with the production of the new long-

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range W class. The first of this class was delivered to Baku for outfitting in the spring of 1951, after having spent the winter months, September 1950 to April 1951, at the shipyard imeni Karl Marx in Astrakhan'. These submarines were towed to the Vano Sturua Shipyard in Baku for final outfitting and sea trials before delivery to the Soviet Navy. 26/ The production of the W class has probably continued at an increasing rate since 1949. A submarine of this class was observed on the launching ways, number 2 east on the shipyard chart, in September 1953. 27/ Assuming that building number 3 is now in full production, it is estimated that the annual production from buildings 3 and 4 is about 26 W-class submarines, or 31,200 SDT. This estimate is based on the concurrent construction of 13 submarines and a building time of 6 months employing one 8-hour labor shift. The fitting-out and trials time at Baku is not considered to affect the building rate at the shipyard and is therefore disregarded in this estimate.

VII. Labor.

Reports regarding the total number of employees in the engineering works and the shipyard vary from about 5,000 to 35,000. 28/ One report estimates employment in 1953 at 15,000, probably working on a 3-shift basis. 29/

It is believed that the plant is currently operating on a one 8-hour shift basis with a number of essential shops, including certain steelmaking activities, on a 3-shift basis.

To produce 12,000 LDT of merchant vessels annually, the shipbuilding activity of the plant is estimated to employ a labor force of about 1,350 persons. To produce 31,200 SDT of submarines annually, about 13,500 persons are employed. Therefore, ship production requires a labor force of about 15,000 persons. Steelmaking, together with machine-building and other engineering activities, employs an additional 5,000 persons, making a total current employment, including administrative personnel, of approximately 26,750 persons.

In IX, below, it is estimated that the plant could produce about 55,440 SDT of naval vessels annually if all ship assembly facilities were devoted to naval shipbuilding. This production would require a direct labor force of 23,500 persons. With an additional 5,000 employed in other activities, the total required employment, direct and indirect, would be about 38,000.

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On a similar basis, to produce 60,000 LDT of merchant shipbuilding annually would require a total of 7,500 persons, with a grand total direct and indirect, of 16,000 persons.

An increase in the required labor force would not be difficult in view of a previously reported employment of 35,000 persons and the absence of any mention in the press of a labor shortage at the shipyard.

It is assumed that the productivity of the free Soviet shipyard worker is comparable to that of the US worker. Therefore, a factor of relative efficiency was not used. However, if forced labor is used in production shops and in ship assembly, it is doubtful that the estimated production rates could be met with the estimated total number of employees.

VIII. Sources of Power and Materials.

The plant is well situated to receive imports by rail from the main industrial centers of the USSR by relatively short hauls. Water transport also serves the Baltic and Black Sea areas from 180 to 200 days each year.

Unknown quantities of oil are received from the Baku region by barge and tank car; coal and coke for the local power plant, steel-making, and miscellaneous heating purposes are received from the Donets Basin; zinc, lead, and tin are obtained from the Caucasus region; diesel engines for ship propulsion and auxiliaries are obtained from the Railroad Locomotive Plant imeni Kuybyshev in Kolomna and the Russkiy Dizel' Plant in Leningrad; electric motors and associated equipment are obtained from the Elektrosila - Lenin-Kirov Plant in Leningrad; and other components are obtained from local industrial plants in Gor'kiy. 30/

Electric power is received in part from the small steam power plant of the shipyard and from the large Balakhna Thermal Power Plant, "Gor'kiy" GRES 1. Electric power generating facilities within the Gor'kiy area are estimated at over 200,000 kilowatts (kw). This system is tied in with the Moscow-Gor'kiy Grid, which has a combined generating capacity of about 4 million kw. The estimated consumption of the Krasnoye Sormovo Shipyard No. 112 is 140 million kilowatt-hours per year, with a coincident peak load of 20,000 kw, based on an 80-percent load factor. 31/

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IX. Capabilities and Vulnerabilities.

A. Capabilities.

The development of the shipbuilding facilities indicates greater emphasis on shipbuilding than on repair. Minor repairs can be made with the aid of the floating cranes, but such use of the cranes would greatly retard the simultaneous fitting out of new vessels. There are no graving docks, marine railways, or floating drydocks for the specific purpose of facilitating repairs. It would be possible, however, to use the submarine transporter docks to drydock vessels of less than 1,000-metric-ton displacement weight. The submarine launching ways may have been designed to haul vessels from the water, but such use is considered unlikely because the priority of the submarine building program would require free use of the launching ways.

The capability of the shipyard to build ships, both naval and merchant, is limited by the assembly facilities. The steelmaking works of the shipyard are capable of providing all steel required for plates, castings, and forgings, and the engineering works have excellent machine-building facilities which could furnish the majority of the machinery components. Electric motors and controllers, navigating equipment, electronic apparatus, and all ordnance would probably be produced elsewhere in the USSR. Much of the mechanical equipment installed in vessels currently under construction could be produced by the engineering section of the shipyard, but it is currently being produced elsewhere in the USSR by plants specializing in the production of standardized equipment. It is to be expected that this practice will continue unless these sources of supply are disrupted.

In the event that all shipbuilding facilities should be devoted to building naval vessels, it is believed that the plant would continue to build submarines and possibly some light surface craft. On a one 8-hour labor shift basis with no interruption in the supply of materials, labor, or power, it is estimated that the plant is capable of producing 55,440 SDT of naval vessels annually. This production is equivalent to 42 W-class submarines and 24 patrol craft or large landing ships. Assuming that the plant works three labor shifts and suffers no interruption in the supply of materials, labor, or power, it is estimated that 90,630 SDT could be produced annually. This production is equivalent to 68 W-class submarines and 43 patrol craft or large landing ships.

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Should all shipbuilding facilities be devoted to building merchant vessels, the shipyard would probably continue to build river and Caspian Sea vessels. On a one 8-hour labor shift basis with no interruption in the supply of materials, labor, or power, it is estimated that the shipyard is capable of producing 60,000 LDT of merchant craft annually. This production is equivalent to 32 tugs, 7 Caspian Sea oil tankers, 15 non-self-propelled oil barges, and 30 self-propelled river oil tankers.

It is believed that the engineering works section of the shipyard could support the maximum naval shipbuilding program outlined above. Such production would probably utilize all facilities and drastically reduce, if not preclude, the output of producer goods, other than steel, for other industries.

B. Vulnerabilities.

The plant is well coordinated and one of the principal industrial enterprises in the USSR. Steelmaking and machine building add to its independence of other industries. The plant is centrally located with respect to sources of supply of raw, semifinished, and finished materials from the Urals, the Moscow-Leningrad area, and the Ukraine. The inland waterway system connects with the Baltic, White, Caspian, and Black Seas. Navigation of the inland waterway system is confined to about 6 to 7 months because of ice.

The chief economic problem lies in assuring a steady flow of raw materials and components produced by other industries.

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APPENDIX A

METHODOLOGY

This report was compiled chiefly from postwar intelligence. Little use was made of prewar production data except to gain knowledge of the range and class of vessels built.

The designation of building and shop use and the description of facilities are digests of the reports, mainly by prisoners of war, contained in the consolidated plant folder in the Industrial Register.

Merchant ship production reported in Table 1* was compiled largely from Soviet news releases. Because of the range in types of river vessels built, production was computed in LDT, as this unit of measurement was considered to be the best common denominator. The light ship tonnage for each type was obtained either from Soviet technical publications or estimated from similar US vessels.

In computing the labor requirements for shipbuilding, the working year (man-year) in the USSR is considered to be about 2,224 working hours (that is, 365 days minus 87 days for regular days off, holidays, absenteeism, and vacations leaves 278 days; 278 days at 8 hours per day equals 2,224 man-hours).

For merchant ship construction, the number of man-hours required to construct one LDT in the USSR is estimated in Table 2.**

Using the production reported in 1950, the average number of man-hours required to produce one LDT is 245. Applying this average figure and a 2,224-hour man-year to the estimated current annual production of 12,000 LDT gives a requirement for a direct labor force of 1,350 persons.

Submarine production requires an estimated 966 man-hours to construct one SDT. Applying this figure and a 2,224-hour man-year to the estimated current annual production of 31,200 SDT gives a requirement for a direct labor force of 13,550 persons.

* P. 11, above.

** Table 2 follows on p. 18.

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Table 2

Man-Hours Required to Construct One Light Displacement Ton
of Merchant Vessels

<u>Type</u>	<u>Man-Hours per LDT</u>
Oil barge <u>a/</u>	120
Cargo <u>b/</u>	300
Tug <u>b/</u>	250
Dredge <u>c/</u>	250
Icebreaker <u>b/</u>	400
Crane ship <u>b/</u>	450

a. Non-self-propelled.

b. Self-propelled.

c. Both non-self-propelled and self-propelled.

The current total direct labor chargeable to shipbuilding, both naval and merchant, would be about 15,000 persons. Administrative, technical, and clerical (indirect labor) is estimated to comprise about 25 percent of the total direct and indirect labor.

The estimate of maximum naval production, when all ship assembly facilities are devoted to this use, is based on the following facility use and rate of building: (1) the production of submarines in buildings 3 and 4 will continue uninterrupted throughout the year with a building rate of 2 submarines per year from each assembly way, or a total of 26 submarines per year from the 2 buildings (although launching is restricted to 6 to 7 months each year, scheduling of production would be adjusted to suit this climatic condition); (2) 16 submarines can be assembled concurrently in basins 30 and 31 (since launching is possible only once each year, during the flood stage of the river in April or May, production scheduling would be adjusted to suit); and (3) ship assembly in area 8 along the bank of the Volga river be devoted to the construction of light surface craft such as landing craft, patrol craft, or motor torpedo boats. For estimating purposes, a vessel 160 feet long and having 210 SDT was used. About 12 such vessels could be assembled concurrently, and with a building rate of

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2 launchings each year, this area would produce 24 vessels, or 5,040 SDT. The foregoing rate of building is based on one 8-hour shift. It is estimated that production can be increased from 1.7 to 2 times by the employment of three labor shifts. Production in buildings 3 and 4 can possibly be increased 2 times because of excellent sheltered working conditions, whereas the increase in area 8 may not be greater than 1.7 times. No increase is credited to production from basins 30 and 31, because launching can be accomplished only once each year. Any increase in the rate of build therefore would be nullified by the limited use of the basins. Maximum naval production is estimated in Table 3.*

The estimate of maximum merchant production, when all ship assembly facilities are devoted to this use, is based on the following facility use and rate of building: (1) building 3 will be devoted to building self-propelled river tankers at a rate of 3 per year from each assembly way; (2) building 4 will be devoted to building tugs at a rate of 4 per year from each assembly way; (3) area 8 will be devoted to building non-self-propelled oil barges at a rate of 3 per year from each assembly way; and (4) basins 30 and 31 will be devoted to building Caspian Sea tankers at a rate of 1 per year from each assembly way. Launching is subject to the same restrictions as outlined for naval shipbuilding. Maximum merchant ship production is estimated in Table 4.**

* Table 3 follows on p. 20.

** Table 4 follows on p. 21.

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Table 3
Estimated Naval Vessel Annual Production Capacity
of the Krasnoye Sormovo Shipyard No. 112 a/

Location b/	Production per Year									
	Type	Length (Feet)	Tonnage (SDF)	Time on Ways (Months)	One Shift		Three Shifts			
					Number (Units)	Weight (SDF)	Number (Units)	Weight (SDF)		
3	Submarine	250	1,200	6	6	7,200	12	14,400		
4	Submarine	250	1,200	6	20	24,000	40	48,000		
8	Patrol	160	210	6	24	5,040	43	9,030		
30)	Submarine	250	1,200	12	16	19,200	16	19,200		
31)										
Total						55,440		90,630		

a. Because of the character of the building ways and the history of production, this table is based on the construction of selected types of naval vessels rather than on building way capacity.

b. Numbers indicate location on the chart of the shipyard, inside back cover.

Table 4
Estimated Merchant Vessel Annual Production Capacity
of the Krasnoye Sormovo Shipyard No. 112 a/

Location b/	Type	Length (Feet)	Tonnage (LDT)	Time on Ways (Months)	Number (Units)	Production per Year (SDT)
Tug-building shop c/ 3	Tug River tankers	132	250	d/	8	2,000
4	Tug	230	750	4	30	22,500
8	Oil barges e/	132	250	3	24	6,000
30)		370	520	4	15	7,800
31)	Caspian Sea tankers	420	3,100	12	7	21,700
Total						60,000

a. Because of the character of the building ways and the history of production, this table is based on the construction of selected types of merchant vessels rather than on building way capacity.

b. Numbers indicate location on the chart of the shipyard, inside back cover.

c. Probably building 13.

d. Number of ways unknown; production of 8 per year estimated from Soviet press releases.

e. Non-self-propelled.

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APPENDIX B

GAPS IN INTELLIGENCE

The major gap in intelligence is the lack of specific information on the current facilities of the Krasnoye Sormovo Shipyard No. 112. Of first priority would be data on ship assembly facilities and method of construction. Next in importance would be data on the steelmaking, rolling mill, structural fabrication, foundries, forges, machine-building, and other shops that support shipbuilding and are engaged in the production of producer and consumer goods. Information is also desired on the technical section for the design of river and Caspian Sea vessels and possibly of naval vessels.

Information is needed on current production of both producer and consumer goods; availability and efficiency of manpower; sources of raw, semifinished, and finished material; destination of products; technological processes; capital investment; and budgets.

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APPENDIX C

SOURCE REFERENCES

The compilation of data and the preparation of estimates and conclusions were derived from research in the files of the Industrial Register, the CIA Library, and the Graphics Register and from discussions held with other IAC member agencies.

The documents reviewed in the Industrial Register were mainly raw intelligence consisting chiefly of prisoners-of-war reports. The reliability of single reports could be evaluated only on their contribution to the report as a whole. The composite of selected reports may be given a rating of possibly true.

The documents reviewed in the CIA Library were publications of IAC agencies, naval attache reports, and a few foreign government intelligence reports and digests. The documents reviewed in the CIA Library have been given a high evaluation because they represent the considered opinion of experienced observers and analysts.

The CIA Graphics Register was used to obtain aerial and ground photography from which the location of the shipyard and installations could be determined.

Evaluations, following the classification entry and designated "Eval.," have the following significance:

<u>Source of Information</u>	<u>Information</u>
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

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"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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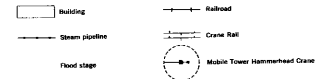
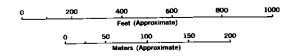
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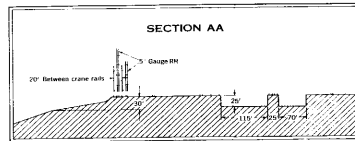
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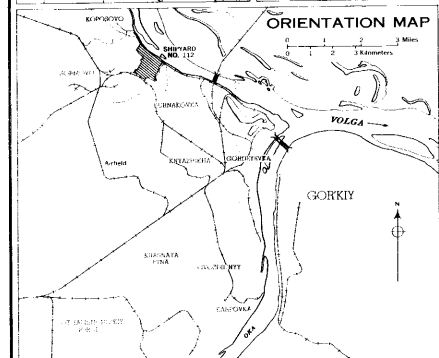
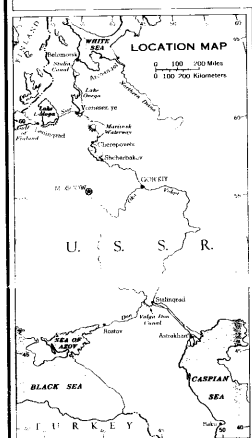
**KRASNOYE SORMOVO
SHIPYARD NO.112
GORKIY, GORKIY OBLAST**



1. Plant Boundary
2. Launching Ways
3. Submarine Assembly Building
4. Submarine Assembly Building
5. Dump
6. Not Identified
7. Not Identified
8. Shipbuilding Area (Dumb Barges and Light Craft)
9. Not Identified
10. Workshop
11. Mess Hall
12. Not Identified
13. Machine Shop and possibly The Assembly Shop
14. Not Identified
15. Not Identified
16. Machine Shop
17. Barracks
18. Not Identified
19. Not Identified
20. Machine Shop
21. Not Identified
22. Not Identified
23. Not Identified
24. Barracks
25. Not Identified
26. Not Identified
27. Not Identified
28. Not Identified
29. Not Identified
30. Shipbuilding Basin
31. Shipbuilding Basin
32. Not Identified
33. Bridge Crane
34. Not Identified
35. Not Identified
36. Oil Storage
37. Not Identified
38. Not Identified
39. Flood Dam - Removed before spring floods to permit flooding of basins 30 and 31
40. Stream
41. through 128 not Identified



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